

PORTLAND HARBOR RI/FS

APPENDIX F

**EVALUATION OF SEDIMENT HANDLING AND
TRANSPORT FOR COMMERCIAL LANDFILL DISPOSAL
DURING REMEDIAL ACTION
FEASIBILITY STUDY**

June 2016

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TABLE OF CONTENTS

LIST OF FIGURESF-i

F1. POTENTIAL DISPOSAL FACILITIES.....F-1

F2. TRANSPORT AND DISPOSAL APPROACHES USED DURING EARLY
ACTIONS F-3

F2.1 GASCO Removal Action.....F-3

F2.2 Terminal 4 Removal Action F-3

F3. EVALUATION OF SEDIMENT HANDLING AND TRANSPORT OPTIONS F-4

F3.1 On-site Processing F-4

F3.2 Off-Site Processing F-4

F3.3 Transportation Routes F-5

LIST OF FIGURES

Figures F-1 Locations of Transload and Disposal Facilities

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F1. POTENTIAL DISPOSAL FACILITIES

Remedial alternatives evaluated within the FS include disposal of dredged sediment and riverbank soils at commercial landfills. The commercial landfills evaluated in the Portland Harbor FS include the following:

- Hillsboro Landfill: municipal solid waste (MSW) landfill located near Hillsboro (Washington County), Oregon, and operated by Waste Management
- Northern Wasco County (Wasco County Landfill): MSW landfill located near The Dalles (Wasco County), Oregon
- Roosevelt Regional Landfill: MSW landfill operated by Republic Services near Roosevelt (Klickitat County), WA
- Columbia Ridge Landfill: Subtitle D facility operated by Waste Management near Arlington (Gilliam County), OR
- Chemical Waste Management of Arlington (Chemical Waste): Subtitle C/TSCA landfill operated by Chemical Waste Management near Arlington (Gilliam County), OR

Dredged sediment is assumed to be placed onto barges and transported to either a confined disposal facility (DMM Scenario 1 only) and/or a transloading facility for transport and disposal at commercial landfills (DMM Scenarios 1 or 2). The transportation methods retained for analysis in the FS include truck, rail, and barge transport.

Representative commercial landfills and modes of transport were assumed for each alternative under DMM Scenarios 1 and 2 for purposes of alternative cost estimation. Roosevelt Regional landfill is used as the representative commercial landfill for disposal of contaminated sediment not classified as PTW. The Chemical Waste landfill is used as the representative commercial landfill for non-reliably contained and NAPL PTW. Based on discussions with those representative facilities regarding cost-effective transportation, transport by rail was used as the representative transport method for Roosevelt Regional Landfill, and trucking was used as the representative transport method for the Chemical Waste landfill when developing cost estimates. Although additional refinement of disposal facility and transport assumptions could result in slightly lower alternative cost estimates, those refinements would have to be based on assumptions that may not be fully realized until during remedial action construction and the cost methodology developed here would meet the FS cost estimate guidance requirements in EPA 540-R-00-002 of +50/-30 percent of actual costs.

Cost is only one of the CERCLA balancing criteria, and differing commercial landfills and associated modes of transport could have positive or negative implications on other evaluation criteria, especially when considering whether transloading occurs within or

outside of the Site. These include compliance with ARARs, short-term effectiveness (especially adverse impacts to workers, community, and environment), and implementability (both technical and administrative feasibility). Transport to a confined disposal facility (CDF) is not evaluated here as transport would likely be entirely by barge and offloading would occur directly at the CDF location.

F2. TRANSPORT AND DISPOSAL APPROACHES USED DURING EARLY ACTIONS

F2.1 GASCO REMOVAL ACTION

During the 2005 GASCO removal action, dredged sediment was placed directly onto a flat deck transfer barge. Excess water within the transfer was collected allowed to return to the Willamette River within the silt curtain containment area. The dredged sediment was then placed into a second sealed haul barge. A minimum of 5 percent drying agent (Portland cement) was added to the haul barge to facilitate drying of the removed material and to increase the material's bearing capacity.

Contaminated sediment was transported via barge and tugboat to the Tidewater Marine facility at the Port of Morrow transfer station in Boardman, Oregon. The trip from the GASCO site to the transfer station took between 20 and 24 hours. A permit from the Oregon Department of Environmental Quality was required for the construction of a temporary transfer station at the Tidewater Marine facility at the Port of Morrow. Improvements at the transloading facility included installing a HDPE liner and secondary containment system. Additional drying agent was added as necessary to ensure that no free water was present and the material passed the paint filter test. The material was then transferred from haul barges to trucks using a trackhoe with a 3-cy bucket. Following inspection, the material was transported 41 miles by truck from the transfer station to the Chemical Waste Management Northwest Subtitle C landfill near Arlington, Oregon.

F2.2 TERMINAL 4 REMOVAL ACTION

During the 2008 Terminal 4 removal action, dredged sediment was placed onto flat deck material barges with 6-foot high fully enclosed watertight steel bin walls. Excess water was transferred with pumps to a water storage barge with a 450,000 gallon total liquid storage capacity. Water was offloaded from the water storage barge and discharged to a sanitary sewer manhole at the Terminal 4 facility under a permit issued by the City of Portland Bureau of Environmental Services.

Dredged sediment was transferred from the flat barge to sealed haul barges and transported to a permitted transloading facility at the port in The Dalles, Oregon. Improvements at the transloading facility included pavement improvements, stormwater management berms, watertight transload box installation and drying agent storage. Material was transferred with a 14-cy cable arm environmental clamshell bucket into a specially constructed transload box. A drying agent was added as necessary to absorb water prior to placement of the sediment in trucks. Loaded trucks transported the sediment to the Subtitle D Wasco County Landfill.

F3. EVALUATION OF SEDIMENT HANDLING AND TRANSPORT OPTIONS

Sediment removed during dredging or excavation is assumed to be placed on a barge, dewatered as necessary, and then transported to either an on-site or off-site transloading for further processing and transport to the landfill.

F3.1 ON-SITE PROCESSING

Dredged material is assumed to be loaded directly into barges and transported to shore for dewatering, treatment, and further transport for disposal. Sediment placed on transport barges is assumed to be dewatered as necessary to prevent overflow and releases to the Willamette River. On-site processing includes offloading the material from the barge to the on-site transloading facility, stockpiling the material, dewatering and water treatment followed by placement of the material into gondola rail cars for transport to either the Chemical Waste facility or Roosevelt Landfill. Based on expected sediment dredging production rates, a 20 acre on-site transloading facility is assumed to be required. Both the Roosevelt Landfill and Chemical Waste landfill are served by rail (Union Pacific or BNSF). It is approximately 140 miles by rail from Portland, OR to either Roosevelt, WA or Arlington, OR.

Transport by barge to an on-site transloading facility and then by rail to either the Roosevelt Landfill or the Chemical Waste facility is expected to limit impacts to the surrounding community by avoiding the use of trucks for transport of contaminated sediments. This reduces the number of loads and prevents contaminated sediments from being transported on local streets and highways. Impacts to the surrounding community for an on-site transloading facility within Portland are expected to be similar to that of an off-site facility due to the generally industrial land use surrounding these facilities.

Estimated costs of transport and disposal are \$79 per ton for a Subtitle D landfill, and \$226 per ton for a Subtitle C landfill. Logistics associated with rail transport are the primary limitation associated this transport mode. Other factors for on-site processing include the CERCLA permit exemption, the availability of land within Portland Harbor for construction of the transloading facility, and the need to develop an on-site transloading facility.

F3.2 OFF-SITE PROCESSING

Based on the experience at the GASCO and Terminal 4 Early Action sites, off-site processing will require contaminated sediments to be loaded directly onto barges, dewatered and then placed into haul barges for transport to either the Tidewater Marine facility at the Port of Morrow (Chem Waste landfill) or a transloading facility in Bingen, Washington (Roosevelt Landfill). Off-site processing includes offloading the material from the barge to the off-site transloading facility, stockpiling the material, dewatering and water treatment followed by placement of the material into trucks for

transport to either the Chemical Waste landfill or Roosevelt Landfill. Contaminated sediments will be transported by truck approximately 70 miles from Bingen to Roosevelt Landfill for Subtitle D disposal, and approximately 40 miles from Port of Morrow to the Chemical Waste landfill for Subtitle C disposal.

The FS did not evaluate the costs associated with barge transport to an off-site transloading facility followed by transport by truck to either the either the Chemical Waste landfill or Roosevelt Landfill. Although there is potential cost savings associated with transport by barge, this will be partially off-set by transport via truck the final distance to the landfill. As a result, the costs associated with barging the sediments to an off-site transloading facility followed by truck transport to either Roosevelt Landfill or the Chemical Waste landfill are expected to be similar to the costs presented in the FS for transport of contaminated sediments from an on-site transloading facility by rail to the respective landfill.

A key advantage of off-site processing is that facilities already exist in Bingen (SDS) and the Port of Morrow (Tidewater Marine) to process contaminated sediments for transport by truck to the landfill. Other advantages include potential reductions in greenhouse gas emissions associated with barge transport. Disadvantages include the need for permits to process the material off-site, barge availability, the need for improvements at the existing facilities and the short term risks associated with transport by truck from the transloading facility to the landfill. Impacts to the surrounding community for an off-site transloading facility in Bingen or the Port of Morrow are expected to be similar to that of an on-site facility due to the generally industrial land use surrounding these facilities.

F3.3 TRANSPORTATION ROUTES

The locations for the identified barge transload and disposal facilities are presented on **Figure F-1**. The transportation route options for these facilities are summarized below¹.

- Hillsboro Landfill: MSW landfill located near Hillsboro (Washington County), Oregon operated by Waste Management
 - Truck: U.S. Highway 30 to Interstate Highway 405 (I-405 to U.S. Highway 26 to State Highway 217 to State Highway 8 to SW Minter Bridge Road; town impacted are Beaverton and Hillsboro.
 - Barge: No barge transport available.
 - Rail: Portland and Western Railway to Hillsboro but not to landfill; unknown ability to use railroad or transload to trucks.

¹ Likely transportation routes are described, but other options may be available.

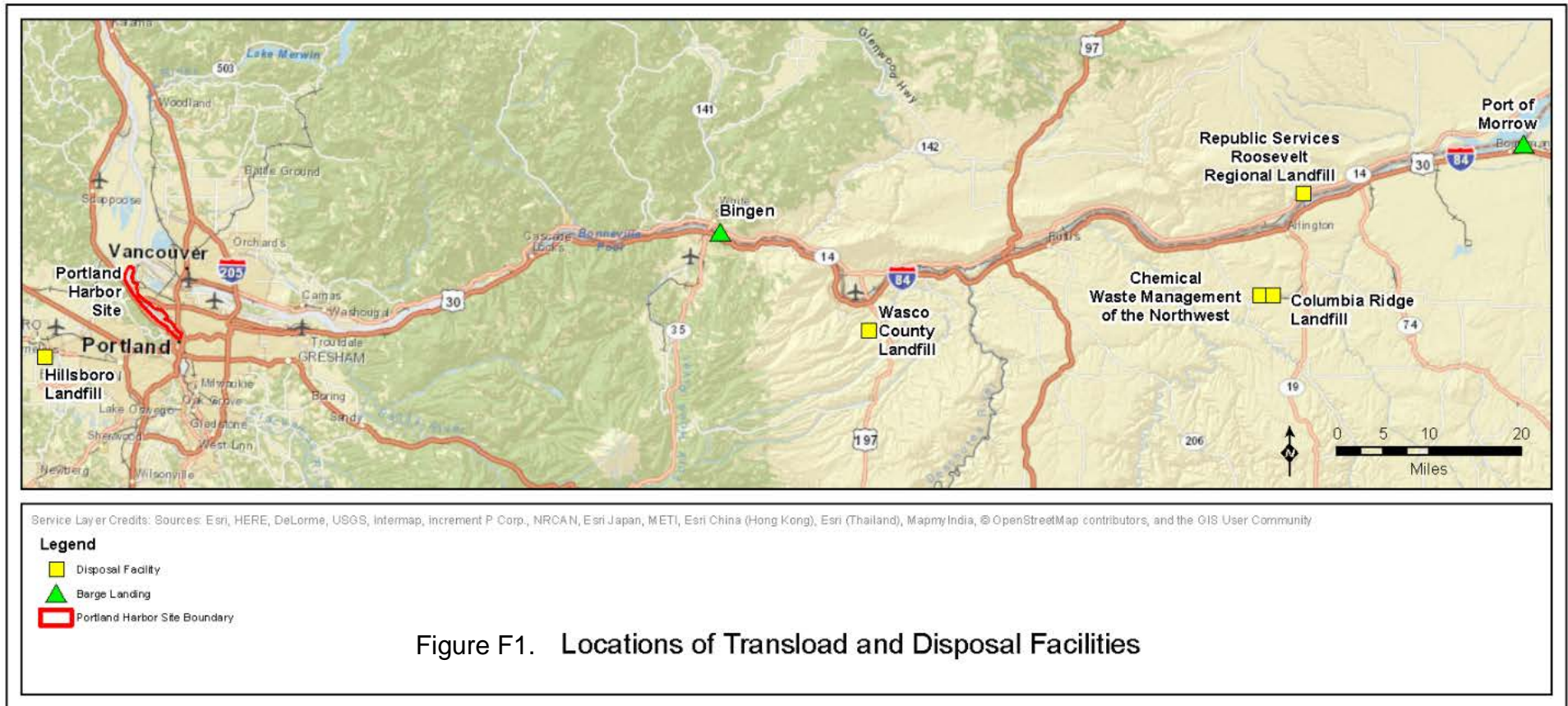
- Northern Wasco County (Wasco County Landfill): MSW landfill located near The Dalles (Wasco County), Oregon
 - Truck: Interstate Highway (I-84) through the Dalles to U.S. Highway 197 to State Highway 115. Towns impacted are the Dalles.
 - Barge: DEQ-permitted Wasco County landfill barge unloading facility on Columbia River in the Dalles, OR (navigation through two lock and dam facilities); transload to trucks at that facility. Accessed by I-84 by River Road and Webber Road.
 - Rail: Union Pacific Railway; railyard in the city of The Dalles; unknown ability to transload to trucks.
- Roosevelt Regional Landfill: MSW landfill operated by Republic Services near Roosevelt (Klickitat County), WA
 - Truck: Interstate Highway (I-84) to Biggs Junction, OR; U.S. Highway 97 over Columbia River bridge to Maryhill, WA; WA State Highway 14 to local road (Roosevelt Grade Road) leading to Roosevelt Landfill
 - Barge: No nearby transloading facility from Columbia River; would need to transload to trucks in Bingen, WA (transport through 1 lock and dam facility) and then access WA State Highway 14 to Roosevelt or use Hood River Bridge to I-84 to Maryville. The other option is to transload to trucks in Arlington (transport through three lock and dam facilities) then use I-84 to Maryville or to Umatilla to access WA State Highway 14.
 - Rail: BNSF Railway to Roosevelt, WA. Rail yard in Roosevelt; transload to trucks there and use Roosevelt Grade Road.
- Columbia Ridge Landfill: Subtitle D facility operated by Waste Management near Arlington (Gilliam County), OR
 - Truck: Interstate Highway (I-84) to Arlington; John Day Highway (State Highway 19) to local road leading to Columbia Ridge Landfill
 - Barge: Port of Morrow facility on Columbia River in Boardman, OR (barge navigation through three lock and dam facilities); transload to trucks and transport using I-84 from Boardman to Arlington.
 - Rail: Union Pacific Railway to Arlington; rail spur on Palouse River & Coulee City Railroad to transloading facility at the Columbia Ridge Landfill.

- Chemical Waste Management of Arlington (Chemical Waste): Subtitle C/TSCA landfill operated by Chemical Waste Management near Arlington (Gilliam County), OR
 - Truck: Interstate Highway (I-84) to Arlington; John Day Highway (State Highway 19) to local road leading to Chemical Waste Landfill
 - Barge: Port of Morrow facility on Columbia River in Boardman, OR (barge navigation through three lock and dam facilities); transload to trucks and transport using I-84 from Boardman to Arlington.
 - Rail: Union Pacific Railway to Arlington; rail spur on Palouse River & Coulee City Railroad to transloading facility at the Chemical Waste Landfill.

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Figures

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